SCIENCE & GOVERNMENT REPORT

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NSF Program Boosts R&D Jobs for Women

With women comprising less than 10 per cent of the PhD-level workforce in the supposedly meritocratic scientific community, political pressure has been rising to increase their job opportunities. What are some of the results?

First of all, continuing investigations of how well this country uses women trained in science reveal an appalling waste of educated talent. Thus, according to recent estimates by the Denver Research Institute, at least 500,000 women in the US hold undergraduate degrees in science or math, but do not hold jobs at all related to their training.

The Institute thinks its estimates are conservative, based on the fact that, since 1950, more than a million women have earned bachelor's degrees in science and engineering. Yet in 1976, the latest year for which firm figures are available, only about 250,000 women were employed as scientists and engineers. An additional

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438,000 women were working outside science and engineering, and perhaps as many as 300,000 women science graduates were out of the labor force altogether.

Since 1976, the National Science Foundation has supported 21 "Science Career Facilitation Projects" at colleges and universities around the country. Although the projects vary in duration and design, they all have the common goal of providing intensive retraining for women who have been out of school at least two years and who want to enter the job market or go on to graduate school.

Because of the success of most of the programs, the Foundation now would like to see more colleges and universities adopt them. In an effort to encourage them to do so, NSF, along with the Denver Research Institute, recently sponsored a meeting on re-entry programs, in Crystal City, Va.

Representatives of some 200 universities, women's counseling groups, and corporations were invited. While most of the representatives appeared to be interested in the prospects of setting up re-entry programs, the message from the campuses was clear: It is the government, not the universities that will have to pick up the tab.

As Bernard J. Bulkin, Dean of Arts and Sciences at Polytechnic Institute of New York, put it:

"All of the fine curricular ideas, the group of inspired faculty, and the pool of anxious participants in a Women's Re-entry Program are for naught if one crucial ingredient is missing: Money."

Some campus officials said they would like to help but were quick to add that their institutions face legal obstacles to creating any special education programs based on sex or race, even if the special programs are intended to help groups who have been discriminated against.

The NSF programs, of course, have not faced such obstacles, whether real or imagined, simply because Congress created them to do precisely what they have done — help women scientists, both black and white, get back into the labor force.

Most, if not all, of the 21 programs sponsored by NSF were reported remarkably successful in achieving their objective.

A study by Alma E. Lantz, a researcher at the Denver Research Institute, shows that approximately 65 per cent of the past participants of the re-entry programs

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In Brief

The widespread perception of Congress as Scrooge and the White House as benefactor of R&D was true for most of this decade, but is incorrect in the Carter presidency, according to NSF. From 1971 to 1977, Congressional R&D appropriations generally lagged behind White House requests, but in 1977-79, Congress dished out more than the President had originally sought.

The figures, from the latest edition of Federal Funds for Research and Development, *show that in 1979, Congressional action in behalf of the "R" in R&D boosted that category to an annual increase of 13 per cent, compared to the 6 per cent Mr. Carter requested. The big gainer was NIH, for which Congress rejected the President's no-increase budget.*

Meanwhile, science-policy aficionados in Washington are still waiting for the resurrection of the State Department's Bureau of Oceans and Environmental and Scientific Affairs that was supposed to take place under Foreign Service careerist Thomas R. Pickering. Sources at State say Pickering's most notable achievement is the logging of extensive, perhaps record, time and mileage in international travel.

. . . "Re-Entry" Students Rank High in Grades

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are currently employed and 10 per cent are now in graduate school. Over a third of the women are working and attending graduate school at the same time.

The majority of the employed women, Lantz found, are working in private industry and making between $10,000 and $20,000 annually.

Some programs, like the one at Chatham College in Pittsburgh, have done even better, with over 90 per cent of their participants employed or going on for graduate training.

The intensive retraining was described as focused on giving the students enough confidence and enough new skills to pick up where they left off. As one participant put it, the women learn that their "brains are still capable of functioning."

Because NSF has wanted to avoid creating a group of highly skilled but unemployable women, the re-entry programs are limited to areas where job prospects are reasonably good: chemistry, engineering, computer science, and a few interdisciplinary, problem-oriented fields.

Depending on the needs of the women, the programs focus either on updating previous skills or teaching new ones — or some combination of the two. Some institutions, for example, offer brush-up courses in chemistry, while providing women with basic classes in computer science and management techniques.

What's probably most important to the success of the programs is that the women are highly motivated, which is as good an argument as any for getting older women back into the labor force where they are likely to be at least as productive as their younger and, perhaps, less grateful counterparts.

At the University of Dayton, for example, one official says that her re-entry women are performing at the top 10 to 15 per cent of the regular undergraduate students. She's even had complaints that the older women are making the regular undergraduates look bad.

Despite what conventional wisdom might say about the longer they've been away, the harder they'll have to work, the oldest women in the programs seem to do the best. The reason for that seems to be that the older women have fewer family obligations interfering with their desires to work.

The conference participants generally felt that NSF should be applauded for its efforts — as far as they go, but that the problem is that the NSF programs fail to confront some serious problems.

Obviously, because of geographical restraints, financial difficulties, and other logistical problems. not all women can participate in re-entry programs. Even if they could, a legitimate question might be asked about whether re-training is really the most efficient way to prepare women for the job market — whenever and wherever they decide to enter it.

It has been suggested that there may be ways to create "preventive" programs — programs that keep women from getting out of touch in the first place, which may turn out to be as important as helping them back in after they've dropped out. — Anne Roark (The author is an Assistant Editor of *The Chronicle of Higher Education.)*

Upton Leaving Cancer Post

As widely rumored, though long denied, Arthur C. Upton has resigned as Director of the National Cancer Institute to become head of the Department of Environmental Medicine at the New York University School of Medicine. Upton, who was appointed to NCI in 1977, says he tired of the administrative load at the $900-million-a-year institute, and wants to be closer to real laboratory work. Vincent T. DeVita Jr., who heads NCI's Division of Cancer Treatment, has been appointed acting director while a search committee looks for Upton's successor.

NASA Authorization Hearings

The four-volume set of this year's Senate authorization hearings on NASA is available without charge from the Committee on Commerce, Science, and Transportation, US Senate, Washington, DC 20510. Send a self-addressed mailing label, and request Parts 1-4, NASA Authorization for Fiscal Year 1980.

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Canada: A Big Boost for Research Spending

Canada's Progressive Conservative government has begun delivery on its campaign pledges to increase the country's research and development effort three fold over the next five years. Following some grumbling in the Canadian science press and elsewhere (including SGR, Vol. IX, No. 19), Hewett Grafftey, the Minister of State for Science and Technology, told the House of Commons on November 15 that the government plans a 32 per cent increase next year in the budget of the Natural Sciences and Engineering Research Council (NSERC), the chief source of grants for university-based research.

The NSERC will be given $160 million in 1980-81, up $39 million from 1979-80. This boost — the biggest since the go-go years of the mid 1960s — was immediately hailed by Canada's scientific associations as a major triumph for their lobbying campaign to reverse a decade-long decline in federal science funding.

Between 1970-71 and 1979-80 Ottawa's support for university research fell in real terms at an average rate of one per cent a year, according to a new background paper from the Ministry of State for Science and Technology. At the same time, the proportion of Canada's gross national product devoted to all R&D declined from 1.2 to 0.9 per cent. Grafftey told the Commons that his party, which came to power in May, still intended to increase total R&D expenditure to 2.5 per cent of GNP, but this has apparently become an open-dated commitment. The government has sensibly stopped mentioning 1985 as its target date.

In addition to announcing next year's NSERC budget increase, Grafftey said the government accepted "the main elements" of a five-year expansion plan prepared by the Council. Funding levels for the remaining four years will be decided within a few months, he said. "The government fully appreciates the need for the Council to have this assurance of financial stability in order that individual researchers, groups and institutions can make the necessary long-term commitments in a research undertaking."

The ability to make long-term research plans again will be particularly welcome to the academic community after the stop-go instability of the former Liberal government's science policy. The two smaller granting agencies, the Medical Research Council and the Social Sciences and Humanities Research Council, have also submitted five-year plans to the Cabinet, and its reaction to them should be revealed any day. At this writing, the federal government is shortly expected to announce a series of initiatives to stimulate industrial R&D, which is very weak in Canada because so many major corporations are foreign-owned and do most of their research at home.

The greatest barrier to the renaissance of Canadian R&D will be the shortage of scientific manpower. The NSERC five-year plan estimates that 26,000 new researchers would be needed by 1983 to meet a 1.5 per cent of GNP target, of whom half would require specialized postgraduate training. "Given the current static or decreasing enrollment in master's and doctoral courses at Canadian universities, it will not be possible to meet that growth from Canadian sources within the short time frame called for," according to the Council.

The supply of masters and doctorates in the applied sciences and engineering, and of doctorates in the physical sciences and mathematics, will be only half to two-thirds of the requirement over the next five years, the NSERC predicts. "The magnitude of the projected deficit suggests that unless dramatic steps are taken to improve the supply of highly trained research manpower within Canada, a target of 1.5 per cent of GNP cannot be achieved by the mid 1980s. While a major program of selective immigration could be launched, it could fail because of increasing demands elsewhere."

Therefore the top priority in the five-year plan is manpower training. This year the NSERC awarded 1758 postgraduate, postdoctoral and professorial fellowships. It wants to award 2822 fellowships in 1980-81 and expand to 6510 by 1984-85. An increasing proportion of these fellowships are to be taken up in industry.

Even if the government agrees to fund this four-fold increase in research fellowships, at an additional cost of $68 million a year, manpower shortages will still produce "a real crunch" by the mid-1980s, NSERC Chairman Gordon MacNabb said. A partial solution might be for foreign-owned companies to bring in some of their own researchers from abroad as they expand their Canadian R&D efforts; the US auto makers, for example, might be able to do this relatively easily.

The second priority for the NSERC is to renew the universities' research equipment, "much of which is old or obsolete," as Grafftey said. Canadian researchers are working inefficiently because they waste time on antiquated and unreliable instruments, often dating back to the 1960s. Yet the impending manpower shortage will make it essential for them to work as efficiently as possible, the NSERC says. The Council has not yet decided exactly how much to spend on new equipment next year, but it will be a substantial slice of the budget, perhaps $35 million, compared to $13.6 million this year.

The five-year plan calls for rapid expansion of so-called "targeted research" to meet specified national needs. In particular, it will direct more money to the Strategic Grants program, which supports research in

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NSF Details 25 Years of R&D Ups and Downs

The best thumbnail history of postwar federal spending patterns for R&D that we've ever come across is contained in the latest edition of the National Science Foundation's annual Federal Funds for Research and Development, *from which the following is excerpted:*

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In the past 25 years Federal research funding has moved through four broad cycles. The first, from 1956 through 1963, was one of rapid growth when DOD missiles programs, NIH biomedical research programs, and NASA space research programs were building strongly. This period covered the Cold War and the response to the U.S.S.R. Sputnik satellite, launched in 1957. Annual funding increases of 20 per cent to 30 per cent prevailed in most years of this period, reflecting a steep upward trend from relatively low levels.

The second cycle, from 1963 to 1966, represented a broader program mix with increases in the Federal research total of approximately 10 per cent annually. Gains had slowed for DOD, HEW, and NASA, the three leading support agencies, as their programs reached later stages of growth. In the case of DOD and NASA many of the earlier research efforts had progressed into the development stage, especially for the NASA manned lunar landing effort. For the Atomic Energy Commission (AEC) and USDA, however, rates of research funding rose. During this period NSF research support, which gained momentum as a result of Sputnik, approached that of USDA for the first time. By 1966 Federal research obligations had reached a record high in terms of constant dollars that was not to be matched for a number of years.

The third cycle, from 1966 through 1973, reflected almost a standstill in the overall effort. This was the period that included the buildup and resulting turmoil of the Vietnam war. The average annual rate of growth for total Federal research funding was only 3.5 per cent, representing a slight decline in real terms. Lack of growth for the larger agencies held down growth for the total, although gains occurred for agency sponsors of the next order of rank. DOD, the leading support agency at that time, reflected no increase in this period

Agency-by-Agency Review: Page 5

when overall R&D funding for this agency was showing little growth. DOD research support suffered partly as a result of the war-induced public feeling that the military should become disengaged from sponsorship of university research, which was mostly basic in character, but to a larger extent as a result of lessened support for all DOD research (85 per cent of DOD research is applied).

The increases for HEW, the second support agency, were moderate since this period was not propitious for large, new health initiatives. NASA's research obligations traced an absolute decline after 1970 as the Apollo mission was completed. The research obligations of AEC showed virtually no growth. The result was that NSF research support, which had been rising rapidly, partly through the assumption of some DOD research projects, overtook the AEC research total for the first time in 1972. In the meantime USDA also underwent considerable research expansion.

After 1973 a fourth cycle was set in motion that was characterized by a resurgence of growth for all the leading support agencies. By this time the erosion of real support for research in defense and space had become apparent, and a general belief had arisen that cancer and heart disease could be conquered, or at least much alleviated, through science. Added to this background was the Arab oil embargo in the fall of 1973, which soon resulted in a rapid increase in funds for energy research.

The average annual rate of increase in Federal research obligations from 1973 through 1977 was 10.6 per cent in current dollars, or 2.3 per cent in constant dollars. The earlier "real dollar" high (1966) was surpassed in 1977, and a real gain of 4 per cent was registered in 1978. The chief areas of growth during this period were biomedical research, especially that devoted

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CANADA

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energy, toxicology, food and agriculture, communications, and oceans.

With so much money directed elsewhere, the proportion left for what the NSERC calls "free research" (i.e., undirected, peer-adjudicated grants) will decrease steadily. If the overall budget grows according to plan, funding for free research will still grow in real terms. If not, basic science could be squeezed badly.

The cooperation of the provincial governments, which are responsible for operating and maintaining Canada's universities, will be essential for the success of the federal science policy, and NSERC officials have embarked on an intensive lobbying effort to urge them to upgrade the facilities of their universities' science departments and hire more young faculty members. With most provinces trying to cut public spending — and the universities a good target because their enrollments are set to fall substantially — they will take a lot of persuading. — Clive Cookson (The author is Washington correspondent for the London *Times Higher Education Supplement.*)

Obligations for Basic and Applied Research

[Dollars in millions]

Agency	Actual 1969	Actual 1978 [1]	Estimated Average annual rate of change 1969-78	Estimated 1979 [1]	Estimated Rate change 1978-79
			Total research		
Total	$4,735	$9,858	+8.5	$10,483	+6.3
Department of Health, Education, and Welfare	1,174	2,750	+9.9	2,886	+4.9
Department of Defense	1,412	2,143	+4.7	2,320	+8.2
National Aeronautics & Space Adm.	803	1,359	+6.0	1,452	+6.9
Department of Energy [2]	417	1,005	+10.3	1,074	+6.9
National Science Foundation	258	748	+12.6	821	+9.7
Department of Agriculture	251	607	+10.3	611	+ .8
Department of the Interior	164	296	+6.8	298	+ .6
Environmental Protection Agency	—	238	—	236	- .7
Department of Commerce	56	193	+14.7	220	+13.9
Nuclear Regulatory Commission [3]	—	132	—	155	+17.3
Veterans Administration	50	101	+8.1	101	- .7
Department of Transportation	57	58	+ .2	60	+4.1
Other agencies	93	227	+10.4	249	+9.7
			Basic research		
Total	$1,779	$3,292	+7.1	$3,637	+10.5
Department of Health, Education, and Welfare	371	866	+9.9	982	+13.4
National Science Foundation	248	688	+12.0	755	+9.7
National Aeronautics & Space Adm.	380	468	+2.4	520	+11.0
Department of Energy [2]	285	433	+4.7	468	+8.2
Department of Defense	277	330	+2.0	371	+12.6
Department of Agriculture	107	251	+10.0	267	+6.3
Department of the Interior	55	159	+12.6	168	+5.9
Other agencies	58	98	+5.9	106	+8.0
			Applied research		
Total	$2,956	$6,565	+9.3	6,846	+4.3
Department of Defense	1,135	1,814	+5.3	1,948	+7.4
Department of Health, Education, and Welfare	803	1,884	+9.9	1,904	+1.0
National Aeronautics & Space Adm.	423	890	+8.6	932	+4.7
Department of Energy [2]	132	572	+17.7	606	+5.9
Department of Agriculture	145	355	+10.5	345	-3.0
Environmental Protection Agency	—	229	—	219	-4.5
Department of Commerce	29	167	+21.6	190	+13.9
Nuclear Regulatory Commission [3]	—	132	—	155	+17.3
Department of the Interior	109	137	+2.6	130	-5.5
Other agencies	180	384	+8.8	417	+8.8

1 Data are based on the President's 1979 budget to Congress. 2 Prior to 1974 Atomic Energy Commission data were used, and from 1974 to 1976 data for the Energy Research and Development Administration were used. 3 Part of the Atomic Energy Commission until 1974. SOURCE: National Science Foundation

France: Nuclear Power Runs into Trouble

Lacking domestic oil and coal, France long ago embarked on an ambitious nuclear-power program which, with multi-partisan political backing and relatively little public dissent, was moving along smoothly — until the recent revelations of serious engineering defects in several French power plants. SGR's Paris correspondent, Francois Seguier, reports on what's come to be known as the "cracks affair."

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After the March 1979 accident at Three Mile Island, the government here — having recently accelerated the timetable for French nuclear development to provide half of all electric power by 1985 — intensified its public relations campaign in behalf of nuclear energy.

The main objective was to cast doubt on the possibility of a similar mishap in the French nuclear system. This objective inspired a *Le Monde* cartoon showing Prime Minister Raymond Barre serenely telling a TV audience that "The American engineers are asses." In a report to the Senate, Minister of Industry Andre Giraud stated, "The probability of a similar accident in France is far less because the emphasis in our country has been on operational procedures and on the qualifications of the operators." Public fears, it was made clear, were attributable to bad journalism, rather than to any deficiencies in the French nuclear program.

It was in this atmosphere, which happened to coincide with the release in France of the film "China Syndrome," that the "cracks affair" became public.

On September 21, the public found out, through leaks to the press, that some cracks had been detected in two essential elements of the primary cooling system on two reactors shortly due to be fueled, the Tricastin plant in the Rhone Valley, and Gravelines I, near the Belgian border.

The cracks were in a massive steel girdle, 3.5 meters wide and 1.5 meters thick, whose purpose is to isolate radioactive water of the primary circuit from water of the secondary circuit. Rupture of the girdle would cause a loss of coolant, and would also release a large quantity of radioactive products. The potential was there for an extremely serious type of accident.

When the existence of the cracks became publicly known, Electricity of France (EDF) — the national utility — immediately adopted the usual practice of scoffing at any suggestion of nuclear hazards, with the director stating that "these superficial defects do not present risks with regards to the operation of the power stations."

The two major labor unions involved, the CGT, which is Communist, and the CFDT, which is closely associated with the Socialists, both expressed opposition to fueling the plants, unless the defects were corrected and additional safety controls installed. EDF refused to make the changes, and Industry Minister Giraud, long a central figure in the French nuclear program, directed EDF to fuel the reactors. The unions responded by padlocking the electrical control panels at the Gravelines plant, blocking the delivery of fuel to Ticastin, and by placing pickets at both. Whereupon the National Assembly demanded an explanation from Giraud, amid Socialist demands for creation of a parliamentary commission of inquiry. On October 6, the EDF decided to delay any further attempts at fueling the plants, the explanation being that it wanted to perform some special engineering studies.

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FEDERAL R&D

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to cancer and heart disease investigations, energy-related research, space-related research, and defense-related research. Public endorsement of the role of science in solving national problems had been renewed.

In the President's 1979 budget, however, a note of austerity was introduced. The total of $10,483 million in proposed research obligations was only 6 per cent higher than the 1978 total, or just enough to match the anticipated inflation, which has since been revised upward. Subsequent to the budget message, Congress added considerable funds for biomedical research and increased agriculture research and energy research over the budget proposals. Thus, even though Congress eliminated some programs and cut others, the final increase in Federal research obligations for 1979 is likely to be on the order of 12 per cent, or sufficient to meet inflation. (Ed. Note: Not quite, of course, since inflation has accelerated more than was anticipated, and the annual rate is now expected to be approximately 14 per cent.)

(Copies of *Federal Funds for Research and Development Volume,* Vol. XXVII, 49 pages, are available for $2.50 each from: US Government Printing Office, Washington, DC 20402. Order by Stock Number 038-000-00-422-1.

Academic Pay at the Bottom

Salaries for scientists and engineers are highest in industry and lowest in academe "for almost all levels of experience and education in all fields," according to a newly published study by the Scientific Manpower Commission: *Salaries of Scientists, Engineers and Technicians, A Summary of Salary Surveys;* Ninth edition, 130 pages, available for $20 per copy from: Scientific Manpower Commission, 1776 Massachusetts Ave. Nw., Washington, DC 20036.

. . . Nuclear Safety Agency Not Notified

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Three weeks later, EDF announced that it would proceed with the loading of Gravelines. This drew a protest from the Socialist-affiliated unions, but not from their Communist counterparts, who regard France's nuclear independence as essential to its independence from American political influence. Ten days later, the EDF announced that Tricastin would be loaded. Ecologists, including Friends of the Earth, asked a Paris court to prohibit the loading, but the court responded that it lacked jurisdiction.

Though the controversy has had no apparent effect on the government's commitment to the development of nuclear power, it has opened the subject to closer public scrutiny, and it has also illuminated longstanding deficiencies in the institutional arrangements for assuring nuclear safety.

The cracks, which were discovered by a workman who reported them to his union, were not officially reported to safety arm of the French Atomic Energy Commission; nor were they reported to the EDF or the Ministry of Industry. The agency responsible for keeping the public informed about nuclear power, the Information Council on Nuclear Electricity, was also kept in the dark — so infuriating its head, Simone Weil, that she successfully demanded that the Prime Minister compel the President of EDF to come before the Council to explain what was happening with the plants.

Details that have come out about the manner in which the cracks were discovered — and ensuing attempts at a coverup — have added to public doubts that the government really knows best when it insists that the French nuclear program is immune to the Three Mile Island malady.

The worker who initially found the cracks told his union chiefs, who informed the contractor, Framatome, which informed Westinghouse, the manufacturer of the pressurized water reactors (PWR). Westinghouse declined responsibility, claiming that its design had been "Frenchified." Secret tests were then performed on two units whose shipment to Iran had been held up. It was found that the cracks were more serious than had been originally thought, and further checks revealed cracks in 25 out of 26 PWRs in France, five of them in operation, the remainder in various stages of construction.

Meanwhile, the EDF refused to acknowledge the seriousness of the problem, and went ahead with its plans to fuel the plants at Gravelines and Tricastin. It was at that point that the unions leaked the information to the press.

Heretofore, French nuclear-power proponents have had a charmed existence relative to their counterparts in other western nations. But given the bungled coverup and the ensuing exposure of laxity in assuring nuclear safety, it is now doubtful that continued smooth sailing lies ahead for France's still highly ambitious nuclear program.

In Print

The 1978 National College Entrance Examination in the People's Republic of China, first of its kind to be offered in China since 1966; collected by the US Office of Education, the 110-page volume contains texts of examinations in politics, math, physics, chemistry, history, and the English language; also includes commentaries by American specialists. Available, for $4 per copy, from: US Government Printing Office, Washington, DC 20402. Order by Stock Number 017-080-02049-1.

Changes in the Future Use and Characteristics of Automobile Transportation Systems, 72 pages, report by the Congressional Office of Technology Assessment, based on "views expressed" by 1300 persons nationwide. OTA concludes the public's much-touted "love affair" with the car should be recognized as a desire for mobility, rather than for any particular means of transportation, though the feasibility of matching the car's mobility is not addressed clearly. Copies available, $3.50 each, US Government Printing Office, Washington, DC 20402. Order by Stock Number 052-003-00710-0.

Innovation Plan Defended as a First Step

With boos coming in from all directions for Mr. Carter's bargain-basement schemes for boosting industrial innovation (SGR Vol. IX, No. 19), the line from the White House science office is that the plan is just a first step and, anyway, it's more than any other President has offered.

That apologetic theme runs strong through the text of a talk by Philip M. Smith, Associate Director of the White House Office of Science and Technology Policy; Smith was OSTP's staff link with the regiment-strength forces that the Commerce Department mobilized for the big studies that led to the innovation turkey, and it may reasonably be assumed that he was spouting the official party line in an address prepared for a conference November 30 at Philadelphia's Franklin Institute.

The studies, Smith said, produced "about 150 recommendations, of which some 40 were selected by Commerce for further consideration by the White House. The President has now decided to pursue more than 30 initiatives at this time.

"Let me emphasize," he said, " 'at this time.' " The reason, he explained, is that regulatory reform is already well underway, and other administrative activity in important areas such as tax reform will be approached in a broader context."

Proceeding with this limping brief for the President's decision to toss out some of the most important recommendations of the innovation study, Smith then took some pot shots at complaints that the big exercise merely plowed over old ground, and produced not one finding or idea that hadn't been around for at least several years.

"When we began the innovation study, we were fully sensitized to the fact that much work had been done on the subject before . . . And there were previous government initiatives and activities," he conceded. "But the data, some of which was generated five to ten years ago, were for the most part ambiguous, dated, and not representative of the current and coherent point of view we felt was needed. Furthermore, no previous administration had undertaken a Cabinet-level study of innovation that would conceivably lead to Presidential initiatives."

Without noting that the little bit of new information turned up by the latest study does not lack for ambiguities about what if anything ails innovation in the US and what might be done about it, Smith then went on to say that he wanted to be "most specific and also most fair to my colleagues who were involved then in R&D and innovation policy at the White House." The problem for them, he continued, was that Lyndon Johnson was preoccupied with the war in Vietnam, and as for that man who followed Johnson, Richard Nixon, the *bete noire* of the science-policy crowd? That Nixon "would at the same time send a message to the Congress on science, technology, and innovation and also lay plans to dismantle his Office of Science and Technology is a footnote in history but also an important point in the context of innovation and Presidential interest."

As sort of an anti-climax, Smith then observed that "President Carter is committed to this issue. His interest will be demonstrated by some follow through."

Perhaps, but the main political energy in the innovation issue is on Capitol Hill, not in the White House. With the current session coming down to the wire, and the Iranian turmoil dominating political attention, there's no chance of Congressional action on innovation until Congress comes back for the New Year. The focus then will be on the House Science and Technology Committee and its closest Senate counterpart, the Commerce, Science, and Transportation Committee. On both, there are influential members who are critical of Mr. Carter's designs for innovation and who would like to get moving quickly, particularly with assistance for small R&D firms and tax incentives.

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